REMARKS

Reconsideration of the present application, as amended, is respectfully requested.

Supports for the amendments

The amendments of claims 1, 16 and 30 are supported by the specification. Particularly see from line 17 of page 40 to line 4 of page 41.

The objection to claim 15 has been addressed by Applicants' amendment in accordance with the suggestion of the Examiner.

Rejections Under 35 U.S.C. 112, first paragraph

The Examiner rejected claims 1, 2, 4-17 and 19-29, requiring a Deposit Declaration. In response a Deposit Declaration has been provided in accordance with the Budapest Treaty.

Further, on page 5 of the Office Action, the Examiner rejected claims 1, 2, 4-17 and 19-29 alleging that the claims do not fulfill the enablement requirement of 35 USC. Applicants respectfully traverse the rejection for the following reasons.

1. A lack of enablement rejection under section 112, ¶ 1 is only appropriate where the written description fails to teach those in the art to make and use the invention as broadly as it is claimed without undue experimentation. Those of ordinary skill in the art are well versed in how to make and use the invention as it pertains to the vaccine art. The utility of the claimed invention is clearly demonstrated by the data provided. Evidence of acceptance of data of this type has already been provided to the USPTO. Thus, unless the PTO has reason to doubt the objective truth of the statements contained in the written description, the PTO must accept the claims as amended herein as bein g enabled by the specification or provide evidence that irrefutably establishes a reason to doubt an invention's asserted utility when considered in combination with the written description.

2. The cited references demonstrate the enablement of the claimed invention. Lechmann et al. teaches that induction of high titer, long lasting, cross-reactive antienvelope antibodies and vigorous multispecific cellular immune responses that includes helper and cytotoxic T-lymphocytes may be necessary for effective vaccine (see abstract). The inventive vaccine composition has the all the requirements defined by Lechmann et al. In addition,

Mikkelsen et al. teaches that the chimpanzee is the only animal model that permits HCV challenge after vaccination. Mikkelsen et al. teaches that a group using HCV-1 E1/E2 gene successfully perform challenges of chimpanzees with recombinant E1/E2 vaccine and the recombinant vaccine is in phase I trials. Mikkelsen et al. introduces experimental challenges of another group using NS3-5B encoding adenovirus and DNA plasmids. In these experiments, although the final outcome of vaccinated animals did not differ significantly from the control group, the virological and clinical courses of infection were markedly different between the groups. Thus, one can expect the usefulness of a vaccine against HCV if the vaccine prevents infection of HCV in chimpanzees.

Regarding challenges of chimpanzees, the vaccine composition of the present invention induced optimal level of cellular immune response to HCV and reduced viral titer as 10 to 100 folds as control group when being re-infected.

3. The USPTO has Already Allowed Patents drawn to HCV vaccines

According to the Examiner's logic, there is no room for allowing a patent application drawn to a vaccine composition against HCV unless there is are phase II trial results. This position, however, is contrary to prior USPTO actions. See, for example other US patents drawn to HCV vaccine compositions. Particularly, Bae *et al.* (US6,887,884) discloses a vaccine composition comprising: a specific antigen, wherein an amount of said specific antigen causes an immune response, wherein the antigen is an HCV protein. However, Bae *et al.* discloses vaccinization only with mice. Depla *et al.* (US6,635,257) discloses a vaccine composition comprising an oligomeric particle having a diameter of 1 to 100 nanometer and consisting of HCV envelope proteins, or parts thereof, wherein at least one cysteine of said HCV envelope proteins, or part thereof, is alkylated. However, Delpla discloses also vaccination only with mice. Further, Shelby *et al.* (US6,121,020) discloses a vaccine composition comprising a secreted E1/secreted E2 complex comprising (a) a hepatitis C virus (HCV) E1 polypeptide, lacking all or a portion of its membrane spanning domain such that said E1 polypeptide is capable of secretion into growth medium when expressed recombinantly in a mammalian or yeast host cell, wherein said E1 polypeptide lacks at least a portion of its C-terminus beginning at amino acid 369 or lower; and (b) a hepatitis C virus (HCV) E2 polypeptide, lacking all or a portion of its membrane spanning domain such that said E2 polypeptide is capable of secretion into growth medium when expressed recombinantly in a mammalian or yeast host cell, wherein

said E2 polypeptide lacks at least a portion of its C-terminus beginning at amino acid 730 or lower. However, Shelby *et al.* discloses no *in vivo* experimental data far from disclosing challenges chimpanzees.

It is clear that the data provided herein is art-recognized as predictive of human efficacy for this class of vaccines and predictive of operability in humans. The rejection under 35 USC 112 first paragraph, can therefore be withdrawn.

The rejections under 35 U.S.C. 102(a), (b) and (e)

The Examiner rejected claims 1, 2, 6, 16 and 21 as being anticipated by Saito *et al.* (US5,731,172).

Applicants however respectfully traverse the rejection. Saito et al. discloses an adenovirus vector comprising a full-length genomic DNA of HCV whose size is 9.5 kb. Saito *et al.* discloses neither a vector comprising a DNA fragment encoding nonstructural proteins consisting of NS3 and NS4 nor a vector comprising a DNA fragment encoding NS5, wherein the size of the DNA fragment ranges 2 to 6 kb). Thus, Saito *et al.* fails to disclose the claimed subject matter of the present invention. In addition, Applicants have amended claims 1, 16 and 30 in order to clarify that the claimed subject matter distinguishes over the cited references.

Amended claims 1, 16 and 21 do not include a full-length genomic DNA of HCV since the size of the DNA fragment included in the vector is limited from 2 to 6 kb. Since the size of the full-length genomic DNA of HCV is 9.5 kb, the DNA fragment recited in claims 1, 16 and 30 of the present invention is not equivalent to the full-length genomic DNA of HCV.

The above-described ground is applied to the rejection regarding anticipation by Tang *et al.* and Pancholi *et al.*

Tang *et al.* discloses an adenovirus vector comprising a DNA fragment (about 2.7 kb) encoding a structural protein consisting of Core, E1 and E2. Tang et al. discloses neither a vector comprising a full length genomic DNA of HCV nor a vector comprising a DNA fragment encoding a nonstructural protein (NS3-4 or NS5). Thus, Tang *et al.* fails to disclose the claimed subject matter of the present invention.

Pancholi *et al.* was published after the priority date of the present invention. In this regard, Applicants herewith submit a certified translation of the priority document, thus perfecting the claim of priority. It can be seen from the claims section in particular that there is

support for the claimed subject matter in the Korean priority document.

The special technical feature of the present invention is to provide a vaccine composition comprising three types of vector which comprises DNA fragments whose size ranges from 2 to 6 kb, respectively. The three different vectors can induce cellular immune repsonse when vaccninating even a larger primate such as chimpanzees.

Fees

This response is being filed with a petition for a three-month extension of time and required fee via credit card authorization. November 24, 2007 was a Saturday. Therefore this response is still considered timely. No further fee is believed to be due. If it is determined that any further fees are due or any overpayment has been made, the Assistant Commissioner is hereby authorized to debit or credit such sum to deposit account 02-2275. Pursuant to 37 C.F.R. 1.136(a)(3), please treat this and any concurrent or future reply in this application that requires a petition for an extension of time for its timely submission as incorporating a petition for extension of time for the appropriate length of time. The fee associated therewith is to be charged to Deposit Account No. 02-2275.

In view of the actions taken and arguments presented, it is respectfully submitted that each of the matters raised by the Examiner has been addressed by the present amendment and that the present application is now in condition for allowance.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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